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TITLE: **DRAIN SPOUT**

FIELD OF THE INVENTION

The present invention relates to a device for use with gutter assemblies such as those on residential, commercial and industrial structures, and in particular to a device for channeling the discharged fluid of a downspout of a gutter assembly.

BACKGROUND OF THE INVENTION

Gutter assemblies are typically mounted about a sloped roof for channeling rain water to one or more vertically oriented downspouts (also referred to as "drain-pipes") which discharge the water at ground level. It is generally desireable to channel this discharged water away from a structure's foundation to avoid water seepage through the foundation or other damage which may result from a buildup of water in the vicinity of the downspout. Hence, extensions, which will also be referred hereinafter as "drain spouts", are often added to the bottom end of downspouts to divert the water further away from foundations. However, prior art drain spouts suffer from many disadvantages.

There are a variety of drain spouts currently available. Often they are merely downspouts made of metal, aluminum, and hard plastic which are cut to a desired length. There are "pressure activated" down spouts made of relatively soft plastic tubes which automatically unroll when filled with water. There are also drains which are "hinge-mounted" onto the bottom end of a downspout, or or some other form of permanent piping attached to the downspout.

Current problems or negative aspects of such existing marketed products include improper structural design, high maintenance costs, installation difficulties, lack of esthetic appeal, lack of versatility, replacement costs (when damaged), lack of durability due to environmental effects (including degradation by heat, light, ozone, low/high temperatures, and freezing), and poor solvent resistance.

In particular, current structural, durability and versatility difficulties or flaws for some of the above products (i.e. for metal, aluminum, hard plastic, and unrolling soft plastic tube products) include breaking, squashing, bending, cracking, splitting (of a product's wall), flattening of each device and solvent erosion. Other flaws include the short life expectancy of hinges or seams of a product.

In some cases the prior art product requires special installation that is not easily done by a purchaser of the product, and so a contractor must be

employed to install the device at increased cost and inconvenience to the purchaser.

Due to most products' fragile nature, they are easily deformed or damaged to the point of requiring repeated repair or replacement on a yearly, monthly, or even weekly basis, depending on the particular product and the environmental circumstances. Environmental hazards such as the aforementioned degradation by heat, light, ozone, low/high temperature fluctuations and freezing potentially "destroy" the current marketed products due to their stuctural and manufacturing shortcomings.

Another common, but less important, factor is esthetic appeal. The average existing product is not designed so much for cosmetic appeal, but more for basic engineered design.

What is therefore desired is a novel drain spout design which overcomes the limitations and disadvantages of the existing devices.

SUMMARY OF THE PRESENT INVENTION

The novel drain spout of the present invention is designed to replace existing drain spouts having the above-noted limitations and disadvantages due to poor quality, design or construction. It provides for a continual flow of water or moisture to improve the performance of existing downspout and gutter systems. In general, the present drain spout is designed to prevent structural

disfiguration or collapse of its original, i.e. undeformed, structural shape to allow flow of water therethrough to resume once an impacting force is removed therefrom.

Regarding structure, versatility, function and especially durability, the novel down spout has structural durability due to its structural characteristics and the chemical make up of the product, which is constructed of a seamless form of rubber tubing (with a compound base of EPDM (Ethylene Propylene Diene Methylene) type rubber) having the following general properties: resistance to degradation by heat, light, ozone; and low air permeability. The rubber also has the following properties: good low/high temperature properties (i.e. –40 to 400 degrees Fahrenheit), good acid and base resistance, fair water swell resistance, fair compression set and good solvent resistance. EPDM rubber is employed because its chemical composition allows for desired flexibility and durability, thus avoiding the breaking, bending, cracking, flattening, squashing, splitting and any impacts, abrasions or tearing of the novel product's walls,.

The estimated life expectancy of the novel rubber drain spout is many years as opposed to the current one week to one year replacement time of current products.

The novel down spout also eliminates the need for hinges and seams, which should provide the prodcut with a longer life span.

The simplicity and resilient nature of the device allows for easy installation, thus avoiding the need to employ outside installation aid (i.e. installation contractors) and saving the consumer time and money.

The product also holds esthetic appeal allowing both cosmetic and engineered functional purposes to coexist.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

Embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings, wherein:

Figure 1 is a perspective view of the drain spout according to a preferred embodiment of the present invention mounted onto an elbow of a vertically oriented downspout;

Figure 2 is a transparent view of the drain spout of fig. 1;

Figure 3 is an end view of the drain spout of fig.1; and,

Figure 4 shows the drain spout of fig.1 deformed upon impact, such as by a human foot.

DESCRIPTION OF PREFERRED EMBODIMENT

The figures show a down spout according to a preferred embodiment of the present invention (generally designated by reference numeral 20) mounted onto an outer surface 15 of an elbow 14 of a typically vertically extending hollow downspout 12. The downspout 12 is typically secured to the wall 10 of a structure and functions to channel water from a gutter assembly above (not shown) or other water source. The elbow 14, and in particular the outlet of the elbow formed by its peripheral lip or edge 16, is typically elevated above ground level 11.

The down spout 20 is an elongate, hollow rubber member, generally about four to five feet (1.2 to 1.5 meters) in length, or as otherwise desired. The down spout has first and second opposed open ends 22 and 24, each of which is preferably sized to snugly slid over the elbow's edge 16 and onto its outer surface 15, resulting in a friction fit to remain on the elbow during use (as best seen in fig.2). Alternately, a caulking or suitable adhesive may be applied to the abutting surfaces to form a secure bond, particularly where the elbow is smaller than the down spout's opening.

When the first end 22 is engaged with the elbow 14, the second end 24 remains open to discharge any water traveling through the down spout. Smooth inside surfaces 26 are therefore provided to avoid snagging any debris (such as leaves) traveling through the down spot, and thus avoid unwanted blockage of

the down spout. The exterior surface 28 of both the opposed upstanding and transverse walls 30, 32 has a series of longitudinal ribs 34 extending the length of the down spout and transversely (i.e. peripherally) spaced thereabout to provide the walls with greater structural integrity without unduly increasing the weight and amount of rubber used. The ribs 34 also have a desireable visual or aesthetic appeal.

An important feature of the invention is the down spout's ability to deform when severely impacted, such as being stepped on (shown in fig.4) or being driven over by a vehicle's tire, and yet resiliently return to its original rectangular profile (as in fig.1). Hence, the down spout is molded to retain a "memory" of its original "undeformed" rectangular shape, and thus spring back to that desired shape after impact to allow continued flow of water therethrough.

Good results have been achieved using a rectangular down spout profile made of rubber material comprised of EPDM, a rubber chemical compound consisting of Ethylene, Propylene, Diene and Methylene. Refering to fig. 3, the desired dimensions of the preferred embodiment at the opening 24 are 3 1/8 inches (about 79 mm) high and 2 ¼ inches (about 57 mm) wide, as this size of opening fits over many conventional elbows. The thickness of the walls 30, 32 is 1/8 inch (about 3.2 mm) at the "troughs" (indicated by numerals 36), and widening to ¼ inch (about 6.4 mm) at the ridges, or ribs, and at the corners 38. There are four ridges 34 along the width of the downspout on both the top and

bottom walls 32, and two ridges 34 on each side wall 30. The rubber material used is black in color, but may be spray painted with colored rubber coating according to the consumer's wishes or for safety purposes (e.g. red for greater visibility).

One method of installing the rubber drain spout, as mentioned earlier, is to simply apply an adhesive (any exterior caulking, sealant or cement good for both rubber and metal, e.g. NP2) to the elbow's outer surface 15 and/or the inside surface 26 of the rubber drain spout, and then to slide the down spout onto the downspout's elbow. Optionally, the drain spout 20 may be attached to the elbow in two orientations. First, the side walls 30 may be vertically oriented as shown in the figures, for use when the elbow 14 of the downspout is located close to ground level 11, with the opposed end 24 of the down spout resting on the ground. Second, the first opening 22 is sufficiently deformable so that the down spout may be mounted onto the elbow at 90 degrees to the above orientation, namely the longer transverse walls 32 are placed vertically to provide greater rigidity (i.e. resistance to bending) in a vertical plane, which is suitable where the downspout's elbow 14 sits high above ground and the drain spout's far end 24 will not be supported on the ground.

The many advantages of the present invention may now be better understood. The present device is designed to address and improve upon the earlier noted deficiencies of prior art devices, such as breaking, squashing,

collapsing, bending, flattening, splitting, cracking, solvent erosion, impact, abrasion, tearing and short life expectancy.

The down spout 20 is designed to avoid degradation by heat, light, ozone and poor air permeability, as well as to provide good low/high temperature properties (-40 to 400 degrees Fahrenheit), good acid/base resistance, fair water swell resistance, fair compression set and good solvent resistance.

Another advantage of the physical structure of the down spout is the employment of an EPDM rubber. As opposed to some other more fragile substances and materials, the EPDM rubber is much more flexible, it has properties preventing its freezing in winter and melting in summer, and from being crushed when impacted, such as when stepped on or run-over by a lawn mower or car. The EPDM material may withstand temperatures from –40 to 400 degrees Fahrenheit, and the rubber returns to its original shape after being deformed (as in fig.4). Further, should moisture be trapped in the down spout and not removed or extracted before freezing, this will not harm the device in that once the trapped water freezes and the rubber simply expands without cracking due to its flexibility. The life expectancy is estimated to range between five to ten years, providing advantageous durability and value to end users. The lack of hinges and seams further avoids undesireable structural flaws in this device.

The above description is intended in an illustrative rather than a restrictive sense, and variations to the specific configurations described may be apparent

to skilled persons in adapting the present invention to other specific applications. Such variations are intended to form part of the present invention insofar as they are within the spirit and scope of the claims below. For instance, should it be desired to discharge water further from a foundation than that provided by one length of the drain spout, then either a longer piece of drain spout may be manufactured, or two or more pieces of drain spout may be joined end to end by suitable means, such as clamps or water-resistant tape. Further, the drain spout may be manufactured in other cross-sectional shapes, such as round or square, to better suit particular applications.